

**PLASMA IMMERSION ION IMPLANTATION APPARATUS
INCLUDING AN INDUCTIVELY COUPLED PLASMA SOURCE
HAVING LOW DISSOCIATION AND LOW MINIMUM PLASMA
VOLTAGE**

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ABSTRACT

A plasma immersion ion implantation reactor for implanting a species into a workpiece includes an enclosure having a side wall and a ceiling defining a chamber, and a workpiece support pedestal within the chamber for supporting a workpiece having a surface layer into which the species are to be ion implanted, the workpiece support pedestal facing an interior surface of the ceiling so as to define therebetween a process region extending generally across the diameter of the wafer support pedestal. The reactor further comprises a source power applicator and an RF plasma source generator coupled to the source power applicator for inductively coupling RF source power into the chamber. A gas distribution apparatus furnishes process gas into the chamber, and a supply of process gas furnishes to the gas distribution apparatus a process gas containing the species. An RF bias generator is connected to the workpiece support pedestal and has an RF bias frequency for establishing an RF bias.